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Introducing Microsoft Unified Communications

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Instant Messaging and integrated voice communications have become an everyday business and a personal necessity. The demand for Instant Messaging alone has increased dramatically over the past several years and is predicted to become the preferred communication solution over e-mail in the near future. Within the past year, billions of instant messages were sent each day, and will certainly increase due to the overwhelming popularity of having direct, real-time access to colleagues, friends, and family at the click of a button. Today's youth, which includes my own children, already communicate with one another via Instant Messaging using popular applications such as Yahoo Messenger, AOL Instant Messenger, and MSN Messenger. These applications have also emerged in small and enterprise businesses as preferred communication tools as a result of the immediate contact they enable. The use of Instant Messaging in the enterprise is changing the perception of Instant Messaging as an entertainment solution to a real-world business-critical application.

Of course, as Instant Messaging becomes more prevalent in the business community, security remains a primary concern. With the new threat of SPIM (Instant Messaging Spam) and Instant Messaging viruses, IM poses great risks to business organizations. Despite these risks, and alongside the need for a secure, unified communications solution, many other challenges face business users today. Based on surveys and polls taken over the past two years, the most common challenges include the following:

- Travel
- Telecommuting
- Distributed teams and global communication
- Time-to-market pressures
- Access to information and subject matter experts
- Cost reduction

Business users today are under serious pressure to provide even greater efficiency in all of their assigned tasks. With new government sanctions for compliance, reduced labor, and the globalization of the workplace with outsourcing, the ability to access information and expertise, while reducing travel and associated costs is extremely difficult. Time-to-market pressure has increased with the pressure applied to companies to provide products and results to validate shareholder investments. The corporate landscape has changed as well with reduced travel, increased telecommuting, and geographic disparity with outsourcing and globalization of the workforce. All of these challenges demand solutions to increase productivity and collaboration, while reducing costs. The Microsoft Unified Communications platform has placed a focus on providing a solution for each of these challenges, leaving time for innovation and ingenuity.

The purpose of this chapter is to provide an overview of the Microsoft Unified Communication platform and to introduce Microsoft Office Live Communications Server 2005 with Service Pack 1, a product that addresses the aforementioned business challenges by providing a unified platform of real-time communication and collaboration solutions. This chapter covers the following Microsoft Unified Communications components:

- Live Communications Server 2005 with Service Pack 1
- Session Initiation Protocol (SIP)
- Transport Layer Security (TLS)
- Microsoft Office Communicator 2005

Introducing Microsoft Office Live Communications Server with SP 1

Part of the Microsoft Office System and the Microsoft Unified Communications suite of products, Live Communications Server 2005 SP1 provides enterprise-level security, scalability, and performance by offering a flexible infrastructure and enterprise platform that enables real-time communication and collaboration. The launch of Live Communications Server 2005 SP1 was the answer to numerous customer and industry requested features, including telephony integration and call control features, Instant Messaging threat protection and filtering, and the most exciting feature of them all, Public Instant Messaging Connectivity (PIC). The PIC feature within Live Communications Server now provides the capability to communicate with popular public Instant Messaging applications, including Yahoo Instant Messenger, AOL Instant Messenger, MSN Messenger, and a new client application called Microsoft Office Communicator 2005. With the Communicator 2005 client, a user can now seamlessly communicate with co-workers, business partners, customers, friends, and family with one client application. The purpose of Microsoft's "unified communications" vision is not only to supply customers with a solution that fits their immediate needs, but also to provide a foundation for future development and enhancements. As many companies are starting to implement Instant Messaging and real-time communications technologies within their enterprise infrastructure, Live Communications Server provides a complete solution, and one that is integrated within the Microsoft Office suite of products. Moreover, it provides

an application interface to enable communications, presence, and collaboration features to be built into custom applications. By building the Unified Communications products within the Office suite of products, Microsoft was able to provide customers with desired features within products with which they are already familiar. Millions of users start their day with Microsoft Office, including Microsoft Outlook, Excel, PowerPoint, and SharePoint. The Unified Communications vision is to provide interoperability with the Office suite of products to increase productivity, while maintaining desktop familiarity and ease of use. Realizing their original vision only three years later, users can now work within one suite of applications, rather than manage separate and disconnected applications.

Microsoft Office Communicator 2005

Another exciting Unified Communications product is the Live Communications Server client, Microsoft Office Communicator 2005. Microsoft Office Communicator 2005 is the new client for Live Communications Server 2005 SP1. With features that include Instant Messaging, audio/video communication, whiteboarding, application sharing, and conferencing capabilities, the Communicator 2005 client has gained enormous popularity, especially with public Instant Messaging integration and telephony integration. A major feature of the Communicator 2005 client is the capability to integrate with existing telephony services. With the Remote Call Control (RCC) feature, the Communicator 2005 client application controls a Private Branch Exchange (PBX) phone system that provides users with features such as call answering and call forwarding. This feature enables users to make and accept calls, and forward calls to other phone numbers, truly liberating users from their desktop phone. Another telephony integration feature of Communicator 2005 is the Public Switched Telephone Network (PSTN) service. With PSTN integration, individuals can use the Communicator 2005 client to leverage conference calling services and Voice over Internet Protocol (VoIP) conversations.

Microsoft Office Live Meeting 2005

To reduce travel costs and to increase global communication, Microsoft has released an additional Microsoft Unified Communications product: Microsoft Office Live Meeting 2005. With Live Meeting, business users now have the ability to launch products, mobilize meetings and conferences, provide live and on-demand training services, and present new ideas without connection boundaries. Integrated with PSTN services and the capability to record meeting and audio sessions, Live Meeting enables true meeting productivity without the need for travel. Live Meeting enhances the Unified Communications portfolio by providing event services, online business meetings, training, customer support, and presentation capabilities. All of this is made possible with features such as PowerPoint, Office Document, PDF, and other data resource uploading. These features enable users to enjoy vibrant presentation, whiteboarding, and application sharing, including live demonstrations and attendee interaction with surveys, polls, and attendee mood awareness. With Live Meeting, presentations and training sessions can be realized regardless of where the participants are located; each service can be cast remotely with only one requirement: an Internet connection. With Live Meeting attendee interaction functionality, presenters and trainers can obtain instant feedback, and more intelligent pre-meeting or event attendee intelligence through the Live Meeting registration system. Rounding out the Microsoft Unified Communications vision, Live Meeting provides capabilities that meet today's business challenges by enabling cost-effective collaboration and communication by reducing or eliminating the need for travel.

The Business Value of Presence

While mobile communications have brought contacts closer than before, the game of "phone tag" is still being played. Instant Messaging technologies present something that telecommunications companies do not offer regarding the ability to view the status of a given contact. Within Instant Messaging applications, contacts can utilize basic presence settings such as Offline, Online, and Away, but with Microsoft Office Communicator 2005, contacts have enhanced presence status settings with features such as integration with PBX and PSTN services and the Microsoft Office Outlook 2003 Calendar presence and schedule. With the provided integration functionality, the Communicator 2005 client will update status automatically based on the availability of the individual. For example, if individuals are scheduled to be in a meeting per their Outlook 2003 calendar, then their Communicator 2005 client will automatically update to the status of "In a Meeting." Now, an individual's co-workers can see that the contact is signed into the system but is in a meeting and should not be disturbed unless absolutely necessary.

Many organizations are now globally dispersed, with employees working in other countries and in multiple time zones. With presence-enabled applications, co-workers, customers, and business partners can decide to use e-mail instead of Instant Messaging to send a communication, expecting a response whenever the individual is online again. This is part of the Microsoft Unified Communications vision combining Exchange Server and Outlook with Live Communications Server, Communicator 2005, and Live Meeting. Another scenario includes waiting for an individual to become available. With Microsoft Office Communicator 2005, contacts can not only see each other's presence, but also when they will be available again. With the Communicator 2005 "tagging" feature, contacts can tag one another so that when they become available or online, a message is presented to the awaiting contact letting them know that the contact they tagged is now available for communication. The value of presence is so great that Microsoft decided to build presence integration within many products, starting with the Office system as the foundation, by enabling presence within Microsoft Office, Live Meeting, and SharePoint (SharePoint Portal Server and Windows SharePoint Services). To further extend presence integration, Microsoft has provided an application interface for Live Communications Server to enable presence functionality within custom developed applications.

Providing Secure Communications

In many businesses today, Instant Messaging has become the preferred method of interpersonal communication, surpassing e-mail, and it will likely become the preferred method of online communication within the next 5–10 years. Many companies are already heavily dependent upon Instant Messaging applications, specifically within trading organizations and call centers. Most messaging occurs between co-workers, but a recent trend has seen a shift in which partners and customers are reliant on Instant Messaging as well. This dependency has also attracted parties that are interested in leveraging these communications for their own purposes, both benign and malicious. As SPAM has attacked the e-mail community, SPIM, a new form of SPAM, is quickly becoming prevalent in Instant Messaging applications

today. Business owners and information technology (IT) decision makers have been faced with securing these communications or banning them completely.

When contemplating which type of Instant Messaging application to deploy, three scenarios present themselves. The first scenario is to enable public Instant Messaging applications provided by companies such as Yahoo, MSN, AOL, and others, which creates a major security breach. The second scenario is to ban Instant Messaging applications altogether, which will result in employee, business partner, and customer dissatisfaction or users who decide to install and use Instant Messaging applications against company policy. The third scenario is to provide users with a client that is secure and manageable. If a company decides to choose the third scenario to deploy a secured and managed Instant Messaging application, limited options are available. Essentially, customers need to decide between Live Communications Server and alternative options such as IBM Sametime. The problem with products like IBM Sametime is that when deployed, users lose the ability to communicate with contacts who are using MSN, Yahoo, or AOL Instant Messaging clients. With Live Communications Server and Communicator 2005, companies can provide their users with a single client that includes connectivity to public Instant Messaging networks and other LCS environments, securely. Live Communications Server dominates the market with this solution, as other applications such as Trillion require users to have an account set up with each public Instant Messaging provider before they can establish communication. With Live Communications Server and Communicator 2005, there is one client and one account, which enables direct access to all the public Instant Messaging networks.

Beyond the rich features and capabilities of the Microsoft Office Communicator 2005 client, Live Communications Server provides multiple layers of security. The first level of security is enabled with the integration of Live Communications Server and Active Directory. LCS uses Active Directory to authenticate users of the Live Communications Server service by validating a user's Active Directory account. Adding another layer of protection, LCS provides Transport Layer Security (TLS) for client connectivity to the Live Communications Server environment, which requires digital certificates to authenticate trusted users and servers within an LCS environment. Implementing certificates within your Live Communications Server environment will ensure a chain of trusted authentication from client to server. Leveraging certificates with Live Communications Server provides encryption for Instant Messaging conversations.

Implementing anti-virus solutions for your Live Communications Server environment is as critical as securing e-mail communications, a lesson learned after many infamous viruses such as the "Melissa" and "I Love You" viruses. With the provided security features included with Live Communications Server 2005 SP1, companies can secure their environment in numerous ways: by disabling URLs within Instant Messaging conversations, by preventing SPIM using the SPIM filter tool, by encrypting communications using Transport Layer Security, by preventing viruses using solutions such as the Microsoft-owned Sybari Antigen product, and by managing the entire environment via Group Policy settings.

Live Communications Server 2005 SP1 Server Roles

Live Communications Server 2005 SP1 is available in two separate versions that vary according to size and type of deployment. Live Communications Server 2005 SP1 Standard Edition is targeted at smaller businesses or single-server implementations, as the Standard Edition only requires one server and includes a scaled-down database using Microsoft MSDE, supporting up to 15,000 users per server. Live Communications Server 2005 SP1 Enterprise Edition provides a scalable and high-performance LCS deployment that includes load balancing, a tiered architecture, and a back-end SQL Server database with cluster support, supporting 20,000 users per server.

Included with the available Standard and Enterprise Edition versions of the software, Live Communications Server provides additional server roles to enable specific features for a Live Communications Server deployment. This section provides an overview of the following server roles that are available, which provide additional features such as IM Archiving, remote access, branch office access, routing, and telephony integration:

- Live Communications Server Access Proxy
- Live Communications Server Proxy
- Live Communications Server Director
- Live Communications Server Front-End Pool Servers
- Live Communications Server Back-End SQL Server Database
- Live Communications Server IM Archiving Server
- Live Communications Server SIP/PSTN Gateway

Live Communications Server Access Proxy

A Live Communications Server 2005 SP1 Access Proxy Server is used to enable remote access for users connecting to a Live Communications Server environment without the need for a Virtual Private Network (VPN) connection. It is also used for federation with other Live Communications Server environments and to enable integration with the popular Public Instant Messaging Connectivity (PIC) service with Yahoo, MSN, and AOL. Enabling connectivity without the use of a VPN connection has become a new standard for Microsoft enterprise server products, including Microsoft Exchange Server 2003. Remote access is a required feature for enterprise organizations, as it enables the capability to offer collaboration and communication solutions to partners, customers, branch offices, and external resources. Figure 1-1 depicts the Live Communications Server 2005 SP1 Access Proxy server.

As Live Communications Server penetrates the marketplace, LCS-enabled organizations want the capability to connect with other organizations that are also running Live Communications Server within their environment. This connectivity between Live Communications Server environments is called *federation*. Federation enables multiple organizations that have deployed Live Communications Server to communicate with one another directly or through what is called a Live Communications Server *clearing house* solution, such as companies that are members of industry-specific organizations. Both the federated and clearing house connectivity options require the Live Communications Server Access Proxy.

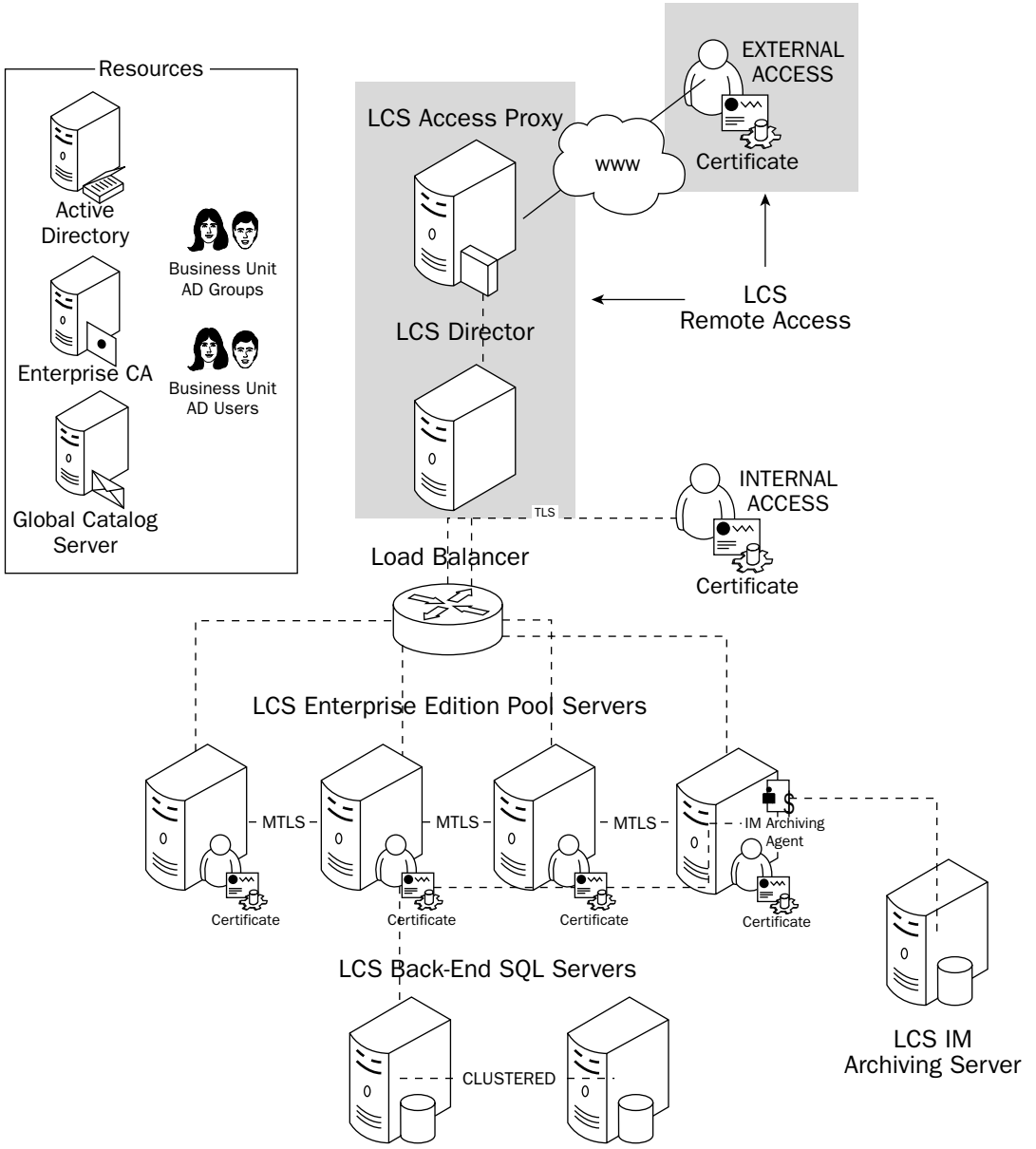
Resources
Active Directory
Business Unit AD Groups
Enterprise CA
Business Unit AD Users
Global Catalog Server
LCS Access Proxy
www
EXTERNAL ACCESS
Certificate
LCS Director
LCS Remote Access
TLS
INTERNAL ACCESS
Certificate
Load Balancer
LCS Enterprise Edition Pool Servers
MTLS
MTLS
MTLS
IM Archiving Agent
Certificate
Certificate
Certificate
Certificate
LCS Back-End SQL Servers
CLUSTERED
LCS IM Archiving Server

Figure 1-1

Live Communications Server Proxy

Applications that provide Instant Messaging and real-time communications are becoming more common than ever. Leveraging the Live Communications Server Proxy, organizations can build real-time applications using the LCS Proxy as an interface between applications that use the Live Communications Server service and the Live Communications Server Enterprise Edition or Standard Edition servers. The Live Communications Server Proxy acts as an application proxy, as depicted in Figure 1-2, enabling data transfer to and from applications that are utilizing the LCS service.

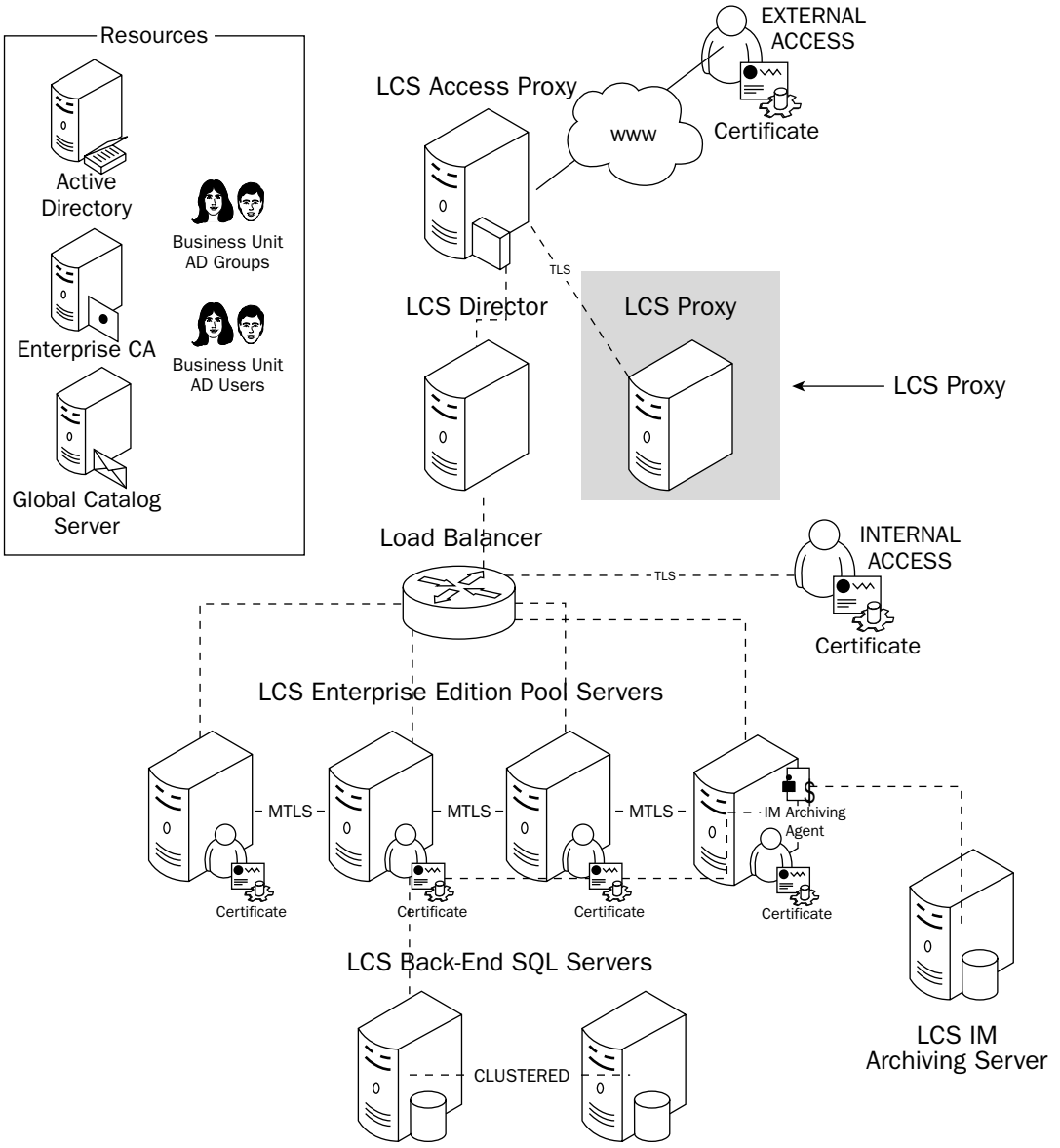

Figure 1-2

The Live Communications Server Proxy provides developers with the capability to write custom real-time applications that leverage the LCS Application Programming Interfaces (APIs). Exposing these components also enables developers to integrate existing Line of Business (LOB) applications to take advantage of the communication, collaboration, and presence features of the Live Communications Server service. For example, integrating LCS with mapping and Geographical Information System (GIS) systems, mobile applications, or even workflow applications provides existing applications with enhanced features.

The Live Communications Server Proxy also provides branch office access to an LCS environment. By using an LCS Proxy, instead of having remote offices all connect through an LCS Access Proxy directly, the LCS Proxy can compress the packets sent from these users to the LCS server environment. The LCS Proxy then sends these client requests to the LCS Access Proxy to route the users to their appropriate LCS server.

Live Communications Server Director

While LCS Access Proxy Servers enable remote connectivity into a Live Communications Server environment, the Live Communications Server Director performs the authentication of the remote user within Active Directory. By design, the Live Communications Server Access Proxy Server does not access the internal directory because an Access Proxy is meant to live on the outside edge of the network. The Director receives the requests from the Access Proxy and then authenticates and transfers each user to a Live Communications Server Standard Edition or Enterprise Edition server.

Figure 1-3 shows a diagram depicting the Live Communications Server Director within a Live Communications Server environment.

Although the Live Communications Server Director is not a required component of a Live Communications Server environment, it is heavily recommended. It helps buffer external communications and handles integration with telephony-based services such as the PBX and PSTN services, which most enterprise and mid-market companies utilize. The Live Communications Server Director provides a layer of abstraction for the Live Communications Server Access Proxy as well so that custom applications that leverage the Live Communications Server APIs do not have direct access into the system. With a Live Communications Server Director deployed, these applications will have a route configured within the Live Communications Server Director console, which allows for better management and control of the internal Live Communications Server environment.

Live Communications Server Front-End Servers

Live Communications Server 2005 SP1 Enterprise Edition is deployed using the concept of a pool of servers. That may be alarming to customers who are already concerned about the amount of required servers to support a Live Communications Server environment, but in order to provide a scalable and highly available solution, the pool architecture enables a Live Communications Server environment with a redundant amount of servers, enabling servers to be removed and replaced in case of system failure or to support growth, i.e., adding more users to the system, easing the pain of enterprise Information Technology administrators. A Live Communications Server pool comprises Live Communications Server pool servers (Front-End) Enterprise Edition Servers and Live Communications Server Back-End SQL Servers. Each Live Communications Server pool can provide service for up to 100,000 users. Each LCS pool server communicates with other servers in the pool to provide highly available user support. This communication occurs over a newly introduced transport called *Mutual Transport Layer Security (MTLS)*, which is an enhanced version of Secured Sockets Layer (SSL) that provides encryption of the communication between users and servers.

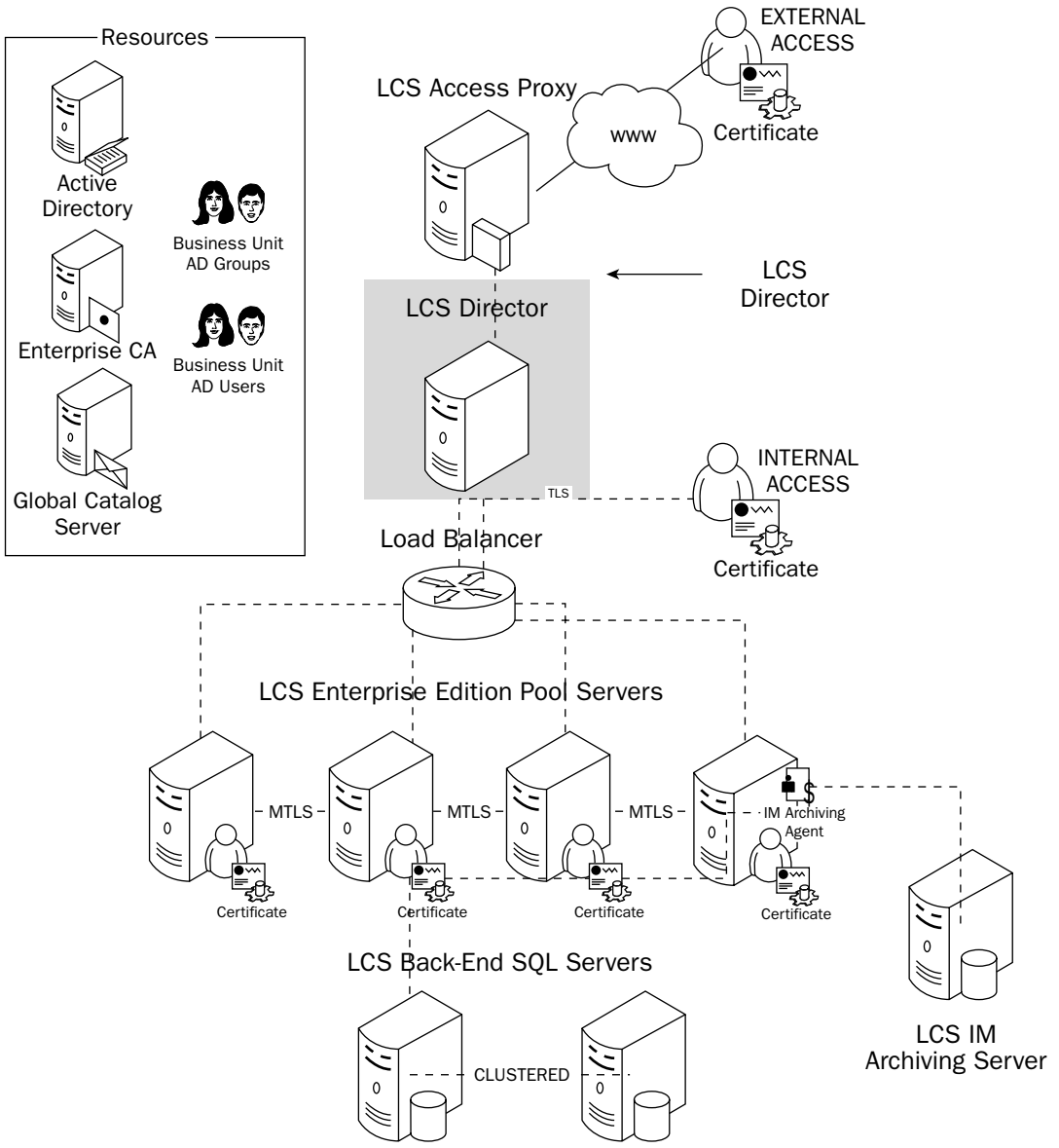

Figure 1-3

Figure 1-4 shows a diagram depicting a Live Communications Server Enterprise Edition pool server within a Live Communications Server environment.

The Live Communications Server Enterprise Edition architecture provides excellent support for organizations that are dispersed globally. Large organizations can deploy Live Communications Server pools in different locations to limit the bandwidth of users communicating overseas or to simply provide a highly scalable and highly available service to its users.

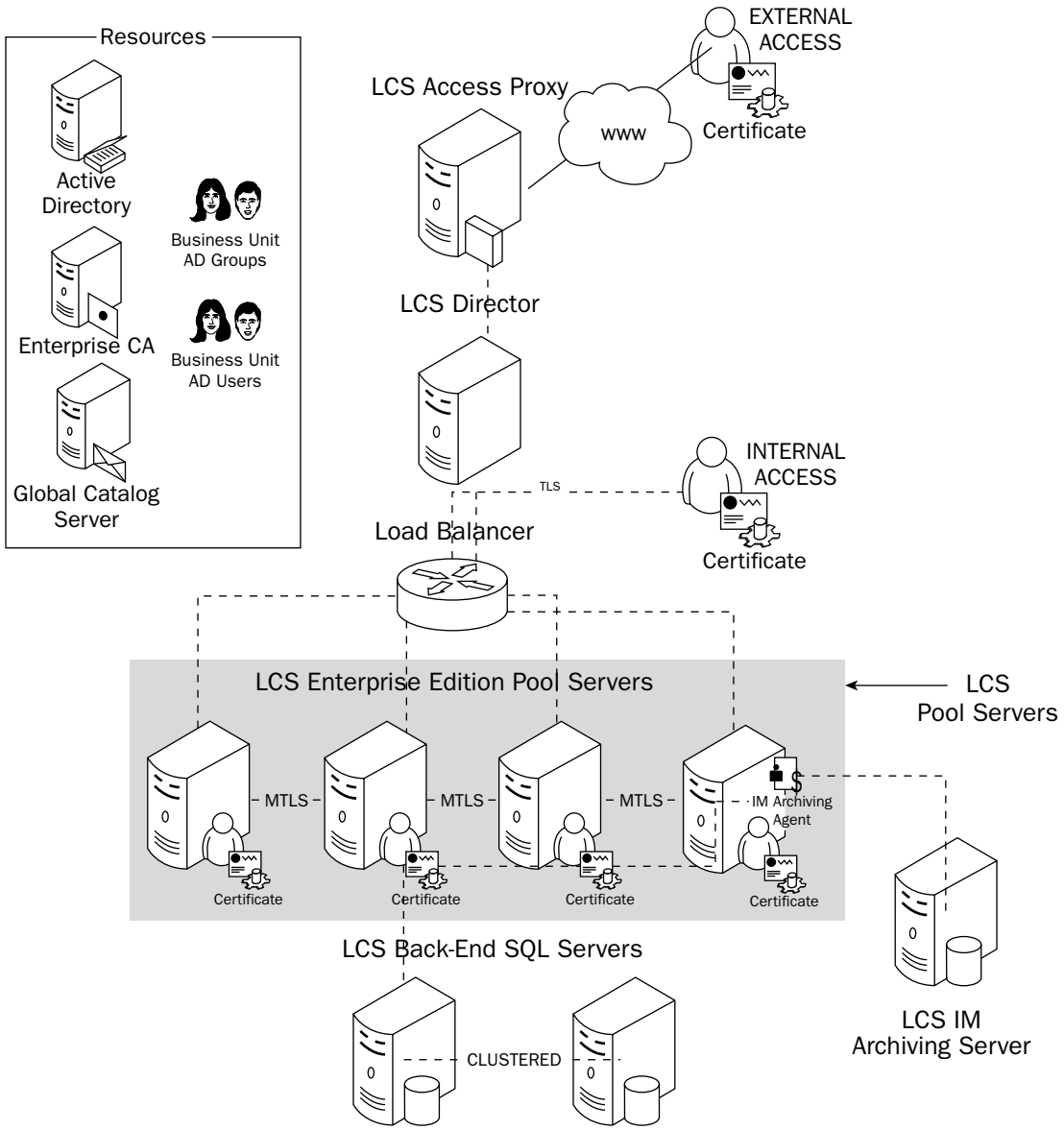

Figure 1-4

Live Communications Server Back-End Servers

The Live Communications Server Back-End Server maintains all of the LCS configuration information as well as LCS user data. This information includes presence information, server configuration data, contact lists, and block and allow settings. The Live Communications Server Back-End Server requires Microsoft SQL Server 2000 with Service Pack 3a at a minimum, and at present Microsoft SQL Server 2005 is currently being tested for full support. Leveraging SQL Server database functionality enables scalability

in that SQL Server can be clustered for performance and fail-over purposes. SQL Server databases can also be attached to back-end Storage Area Network (SAN) storage systems for even more storage capacity.

Figure 1-5 shows a diagram depicting the Live Communications Server Back-End Server within a Live Communications Server environment.

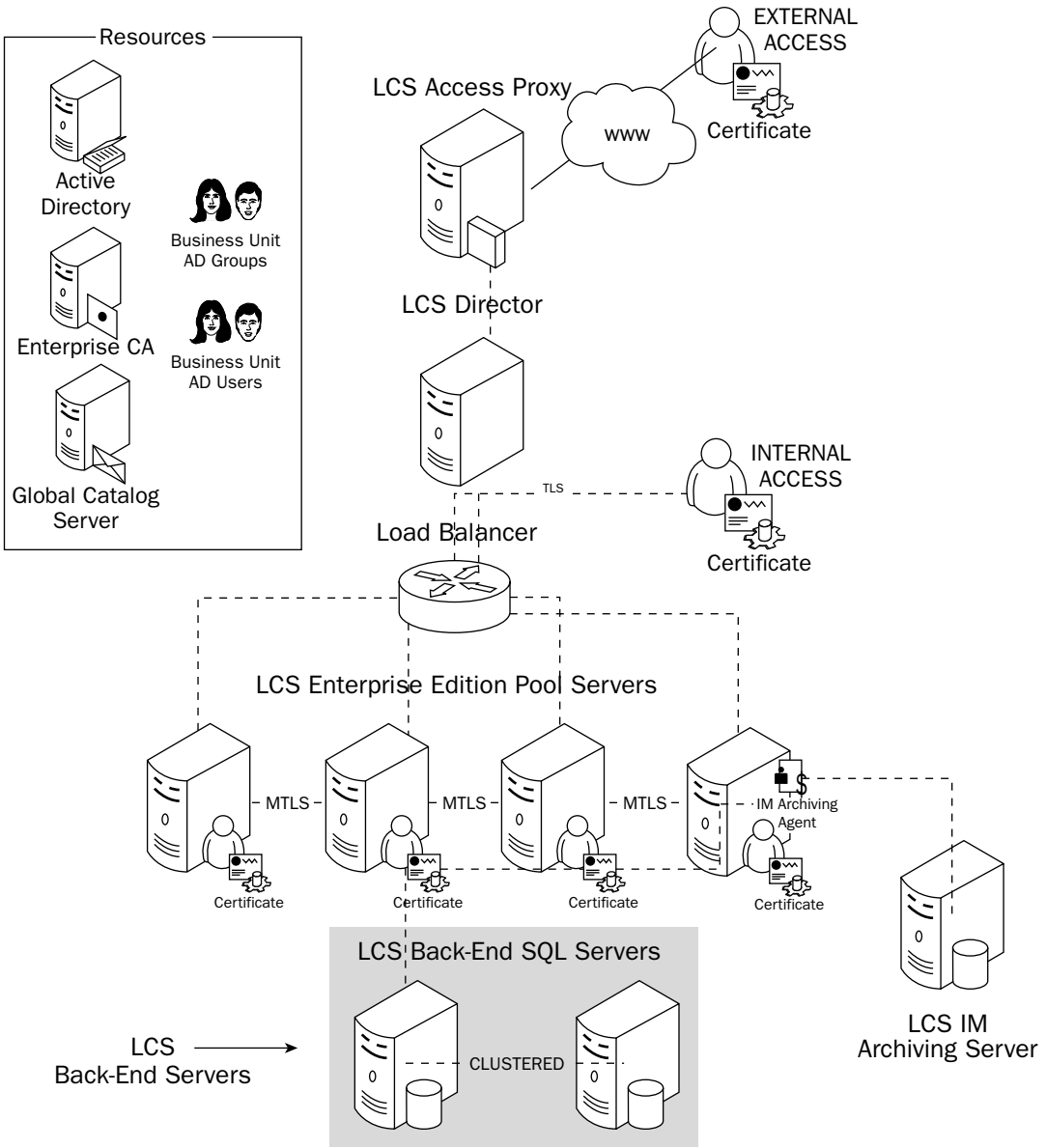

Figure 1-5

Within a Live Communications Server deployment, it is important to place emphasis on back-up and restore services for the Live Communications Server Back-End SQL Servers so that if data is lost on one server, it is available on either the clustered server or back-up tape drive. Regarding the back-up support of a Live Communications Server Back-End server, note that the LCS system is a real-time system, so log shipping and tape backups will not provide a real backup of the system; therefore, they are not supported as part of a Live Communications Server environment. Enabling SQL Server clustering for an LCS environment supports a scenario whereby should one Live Communications Server Back-End Server fail, the Live Communications Server service continues to be operational. Conversely, in an LCS environment with only one Live Communications Server Back-End Server, should that server fail, then all Live Communications Server services terminate immediately.

Live Communications Server IM Archiving

The Live Communications Server IM Archiving Service is an optional service that enables archiving of Instant Messages sent between LCS users. Enabling the IM Archiving Service provides businesses with the capability to archive communications of individual users. The IM Archiving Service is a powerful feature that continues to push the privacy boundaries; nonetheless, it is a necessary service for companies that want to archive communications for security or compliance purposes. The IM Archiving Service, like the Live Communications Server Enterprise Edition Server, requires Microsoft SQL Server 2000 with Service Pack 3a. With SQL Server maintaining archived messages, organizations can build custom reports that provide transcripts of actual messages that have been sent between users of the system, which can be helpful for compliance purposes. For example, for companies that must adhere to compliance policies such as HIPPA and Sarbanes-Oxley, the Live Communications Server IM Archiving Service is a great feature for conversation record retention. In addition, the archived messages can be integrated with existing record retention applications, which maintain existing digital records and messages from other applications such as e-mail and data within an enterprise environment.

Figure 1-6 shows a diagram depicting the Live Communications Server IM Archiving Service within a Live Communications Server environment.

Third-party providers such as IMlogic and Akonix have enhanced the Live Communications Server IM archiving solution by providing more robust and compliance-related features. I recommend the use of the IMlogic IM Manager application for Live Communications Server. This solution provides superior features for IM archiving and compliance. For more information, visit IMlogic's website at `www.imlogic.com`.

Live Communications Server SIP/PSTN Gateway

Another powerful feature of Live Communications Server 2005 SP1 is the integration of telephony services such as Voice over Internet Protocol (VoIP), Private Branch eXchange (PBX) integration, and Public Switched Telephone Network (PSTN) integration. To enable integration between your Live Communications Server environment and a PSTN service such as Verizon Business or British Telecom, the LCS environment must be configured with a Live Communications Server SIP/PSTN Gateway. The Live Communications Server SIP/PSTN Gateway enables users to place a VoIP call using Microsoft Office Communicator 2005.

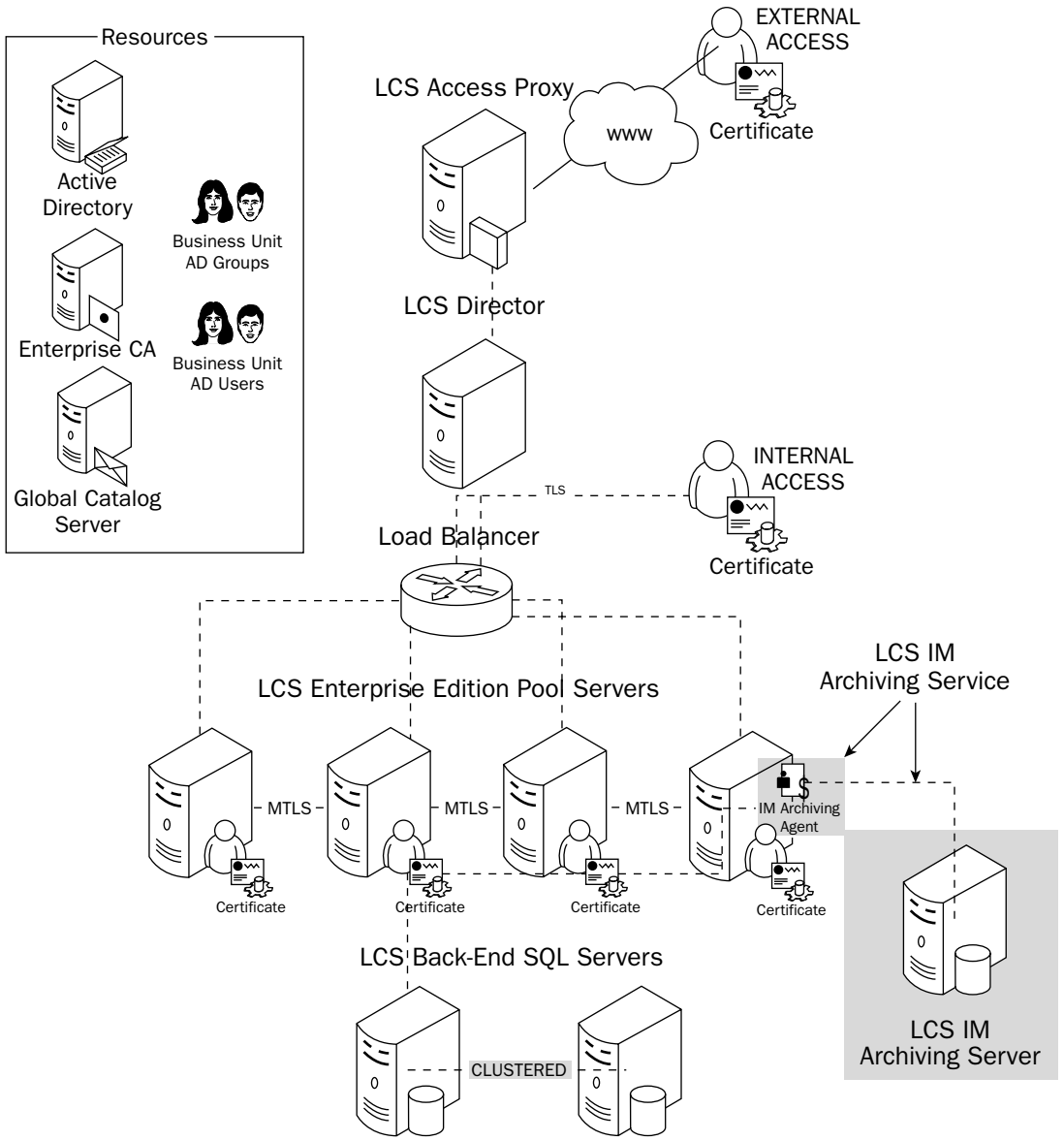

Figure 1-6

Figure 1-7 shows a diagram depicting the Live Communications Server PSTN Gateway within a Live Communications Server environment.

The Live Communications Server PSTN Gateway component is another step in Microsoft's collaborative offerings to enhance the way people communicate within one another without boundaries, making communications more productive. Live Communications Server 2005 SP1 also provides integration with

existing PBX systems by providing Remote Call Control (RCC) to control the phone line in order to receive and make calls using the Communicator 2005 client. No longer are you limited to your desk phone: If you are away from the office, you can still receive calls made to your office line directly from the Communicator 2005 client. In addition, once a call is received, you have other telephony features available, such as call transferring so that you can transfer an incoming call to your mobile phone or device of choice.

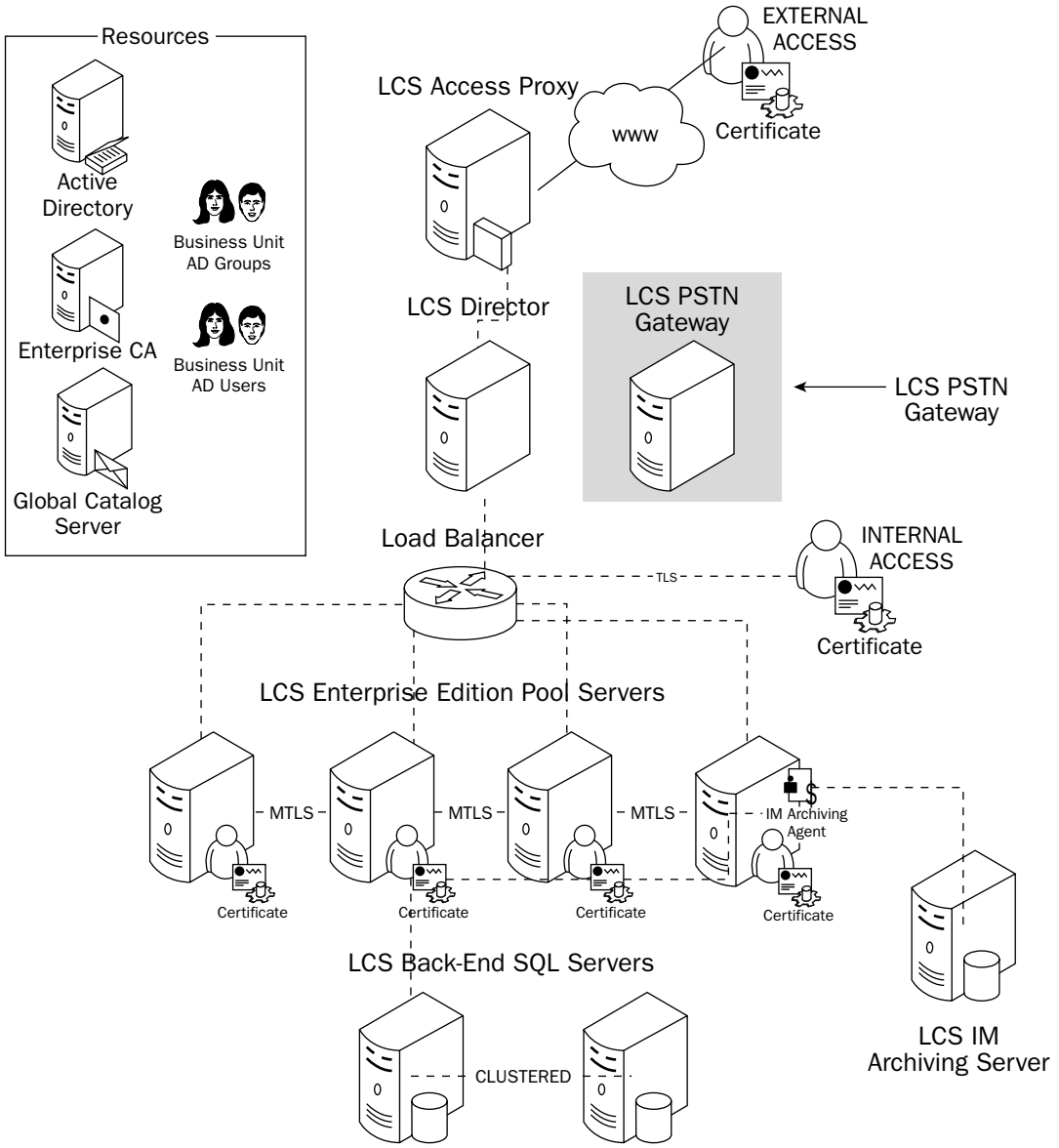

Figure 1-7

Introducing Session Initiation Protocol

Session Initiation Protocol (SIP) is the protocol that Live Communications Server uses to transfer messages between Live Communications Server clients. While this book introduces SIP for its use within Live Communications Server, I recommend that you read the Request for Comment (RFC) 3261, available via the Internet by browsing to `www.ietf.org/rfc/rfc3261.txt`. To describe SIP in laypersons' terms, SIP messages are initiated by a client application that requests information from a SIP server. SIP manages not only instant messages, but also multimedia communications as a whole. In relation to Live Communications Server, Microsoft Office Communicator 2005 and Windows Messenger both initiate SIP requests to a Live Communications Server, and the Live Communications Server responds to each client by sending and receiving instant messages, invoking collaboration requests that include whiteboard sharing, and invoking video and voice communications. This is why when enterprises are interested in integrating Live Communications Server with their VoIP service, the VoIP routers and phones must be SIP compliant in order to provide a seamless connection.

Session Initiation Protocol is the primary multimedia messaging protocol and it is heavily used not only by Live Communications Server, but also by VoIP, PSTN, and PBX providers, as these solutions are becoming increasingly popular in the commercial and residential markets. You've likely heard the Vonage "Woo Hooo" commercial more than one million times. The point is that telephony services, instant communications, and collaboration are now both here and in demand, and Live Communications Server is the best interface for this technology with the release of Microsoft Office Communicator 2005.

Real-time communications have become a necessity among business and consumer markets. The demand for instant communications between individuals has reached an unprecedented level, communications that include not only Instant Messaging, but integrated video, voice, and collaboration communication. Although many people think of teenagers as the prime users of Instant Messaging and webcams, using popular technologies that include Yahoo Messenger, AOL Instant Messenger, and MSN Messenger, these applications have emerged in the business landscape and are rapidly becoming a preferred tool of communication over e-mail. Why not? You can now reach someone immediately and in return receive an immediate response. As suggested earlier, the main issue involved with enabling these popular applications within a business enterprise today is that public network messaging applications do not provide the level of security that businesses require to protect corporate data and communications.

SIP Architecture

SIP is divided into three different components. A SIP *proxy* receives client requests and then determines where to forward these requests (to other SIP servers). With regard to Live Communications Server, a client using Microsoft Office Communicator 2005 sends a SIP request to an LCS SIP proxy server, which sends the request to a Live Communications Server pool server or Standard Edition server. The Live Communications Server pool server or Standard Edition server then acts as the next component of an SIP server: a SIP *redirect server*. A redirect server receives requests from a SIP proxy or a SIP client directory and then responds to a client as to where the message is to be sent. The final SIP component is an SIP *registrar server,* which receives a SIP client request and then maps that client to a specific SIP uniform resource identifier (URI). The SIP URI is the sign-in name that LCS users will use to sign into the LCS service. It is important that you first outline what the SIP URI for your company or customer will be before deploying LCS, as the SIP URI will be a user's identity for all Microsoft Unified Communications products. Currently, the best practice is to use a client's e-mail address as the SIP URI, such as

user1@companyname.com. Properly planning how the company will set SIP URIs for each client will prove useful in later stages of a Live Communications Server deployment and for future use of Microsoft Unified Communications products.

SIP Methods

Session Initiation Protocol uses its own methods to communicate SIP messages between SIP clients and SIP servers. Similar to other Internet protocols, SIP provides a messaging structure. SIP messages include the following methods:

- INVITE
- ACK
- BYE
- CANCEL
- OPTIONS
- REGISTER
- SUBSCRIBE
- NOTIFY
- MESSAGE
- INFO
- SERVICE
- NEGOTIATE
- REFER

Each SIP message request requires a method, a SIP URI, and the version of SIP that the message request is using. The following table describes briefly each SIP method.

SIP Method	Method Description
`ACK`	The `ACK` and `INVITE` message are synonymous in that they are sent together by an initiating client. The `ACK` method verifies that the session has been initiated.
`BYE`	The `BYE` method terminates the SIP session. This method would be used by a contact that has finished its session with another contact and is ready to exit the session.
`CANCEL`	A `CANCEL` method is used by a client that may have a pending message request that it wants to cancel, terminating the request, but not the session. This would be used if a contact wanted to initiate a collaboration sharing session with another contact and then decided to cancel the request, although both contacts could continue other messaging requests such as Instant Messaging each other.

Table continued on following page

SIP Method	Method Description
INFO	The INFO method is used to notify a SIP client about information regarding the contact or contacts with whom a specific contact is initiating a message. For example, in LCS, when a Microsoft Office Communicator 2005 client is Instant Messaging another user, the INFO method is used to indicate whether the other contact is typing a message. The INFO method is also used with 3PCC gateways that allow you to control and view events for your desktop phone. These INFO messages send commands to the PBX and are used to receive events from the PBX.
INVITE	This method initiates a SIP message, including the identifying information for each SIP client as well as the type of message that is to be exchanged (Instant Message, Collaboration, etc.). The INVITE method initiates all sessions and is the root method for SIP.
MESSAGE	The MESSAGE method is used for SIP Instant Messaging sessions. The MESSAGE method contains the actual text message body that one contact sends to another.
NEGOTIATE	The NEGOTIATE method is used to implement settings such as message compression. When used, this is the first SIP message that servers will exchange after TLS negotiation has completed and before user-level SIP data is exchanged.
NOTIFY	SIP clients receive a NOTIFY method response when a SUBSCRIBE event occurs. An example of the NOTIFY method in LCS is when a Microsoft Office Communicator 2005 client receives a notification that they have been added to a contact list.
OPTIONS	The OPTIONS method is used by a SIP client to determine which features have been enabled by the SIP service or other SIP-compliant devices. Regarding Live Communications Server, the Microsoft Office Communicator 2005 client will verify the options available for a contact to use during messaging sessions.
REFER	The SIP REFER method is more commonly known in the VoIP world for forwarding calls. Within Microsoft Office Communicator 2005, you can forward incoming calls to a mobile phone using the REFER method.
REGISTER	The REGISTER method is used to sign users in using their assigned SIP URI.
SERVICE	SIP uses the SERVICE method to add or search for contacts. The SERVICE method uses Simple Object Access Protocol (SOAP) to carry these data transactions. Remember that the Live Communications Server Back-End Server will receive data when a user adds a contact to his or her contacts list or changes other client settings, so the SERVICE method needs to use a messaging protocol that is transaction-based in order to do this, i.e., SOAP.
SUBSCRIBE	SIP clients use the SUBSCRIBE method to subscribe to specific events, including presence status and contact settings such as the allow and block profiles. It also enables clients to be added to contact lists and groups.

Microsoft Office Communicator 2005 utilizes these SIP methods for client registration and to send messages between clients and servers. Figure 1-8 depicts an example of SIP methods that are used by Microsoft Office Communicator 2005.

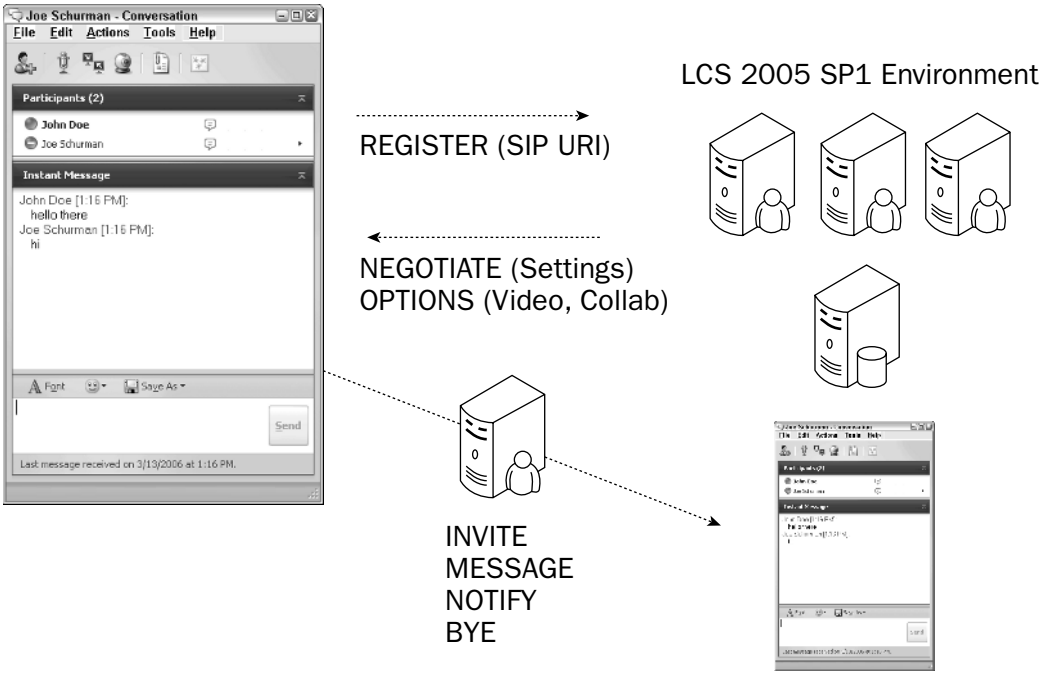

Figure 1-8

SIP Messages

Using the methods described in the previous section, SIP messages are used to communicate requests and responses between SIP clients and SIP servers. The following is an example of a SIP request message:

```
INVITE sip:joes@connectedinnovation.com SIP/2.1
Via: SIP/2.0/UDP workstation1.connectedinnovation.com
Max-Forward: 70
To: "Joe" <sip:joes@connectedinnovation.com>
From: "Dan Willis" <sip:danw@awesome.com>;tag=456
Call-ID: 972-555-5555@192.168.1.102
CSeq: 1 INVITE
Contact: <sip:danw@awesome.com>
Content-Type: application/sdp
Content-Length: 200
```

In this example, Dan Willis is sending an invitation to initiate a messaging session with me. If I want to communicate with Dan, even when it's 2 A.M., I will respond with the following SIP response message:

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP workstation1.connectedinnovation.com
To: "Joe" <sip:joes@connectedinnovation.com>;tag=987
From: "Dan Willis" <sip:danw@awesome.com>;tag=123
Call-ID: 972-555-5555@192.168.1.102
CSeq: 1 INVITE
Contact: <sip:joes@connectedinnovation.com>192.168.1.103
Content-Type: application/sdp
Content-Length: 200
```

As you can see, SIP messages contain the information required for one contact to communicate with another contact, much like our mobile and digital phones use to contact one another — for example, when someone calls you on the phone and you see the Caller ID. Caller ID is one of many settings that are negotiated between callers.

Introducing Transport Layer Security

Transport Layer Security (TLS) is the security protocol that is enabled for use within a Live Communications Server environment to provide encryption and authentication trusts between LCS clients. This book provides an overview of TLS, so I encourage you to read the RFC 2246 for TLS. As the next evolution of SSL, TLS continues to provide an encrypted transport for messaging traffic to be sent and received. Enabling TLS within a Live Communications Server environment, like SSL in a web server environment, requires a Public Key Infrastructure (PKI), which requires certificate configuration and application on both the client and server devices. Live Communications Server requires each server to have a TLS certificate installed, while the root Enterprise Certificate Authority that issued the server certificates must be trusted on the client device, whether it is a laptop, desktop, or mobile device.

Figure 1-9 shows an architecture diagram that depicts how TLS and Mutual Transport Layer Security (MTLS), described in the following section, are used for client-to-server and server-to-server communications within a Live Communications Server environment.

Live Communications Server does not require TLS for client-to-server communication, as it offers TCP as its default communication protocol and uses Active Directory to authenticate users, but it does require MTLS for server-to-server communication, which means if you are deploying a LCS Enterprise Edition pool or multiple LCS servers, you will need to enable MTLS connectivity between servers. Enabling TLS within your Live Communications Server environment will provide the level of security that is required to encrypt and authenticate messages between your Live Communications Server users and servers.

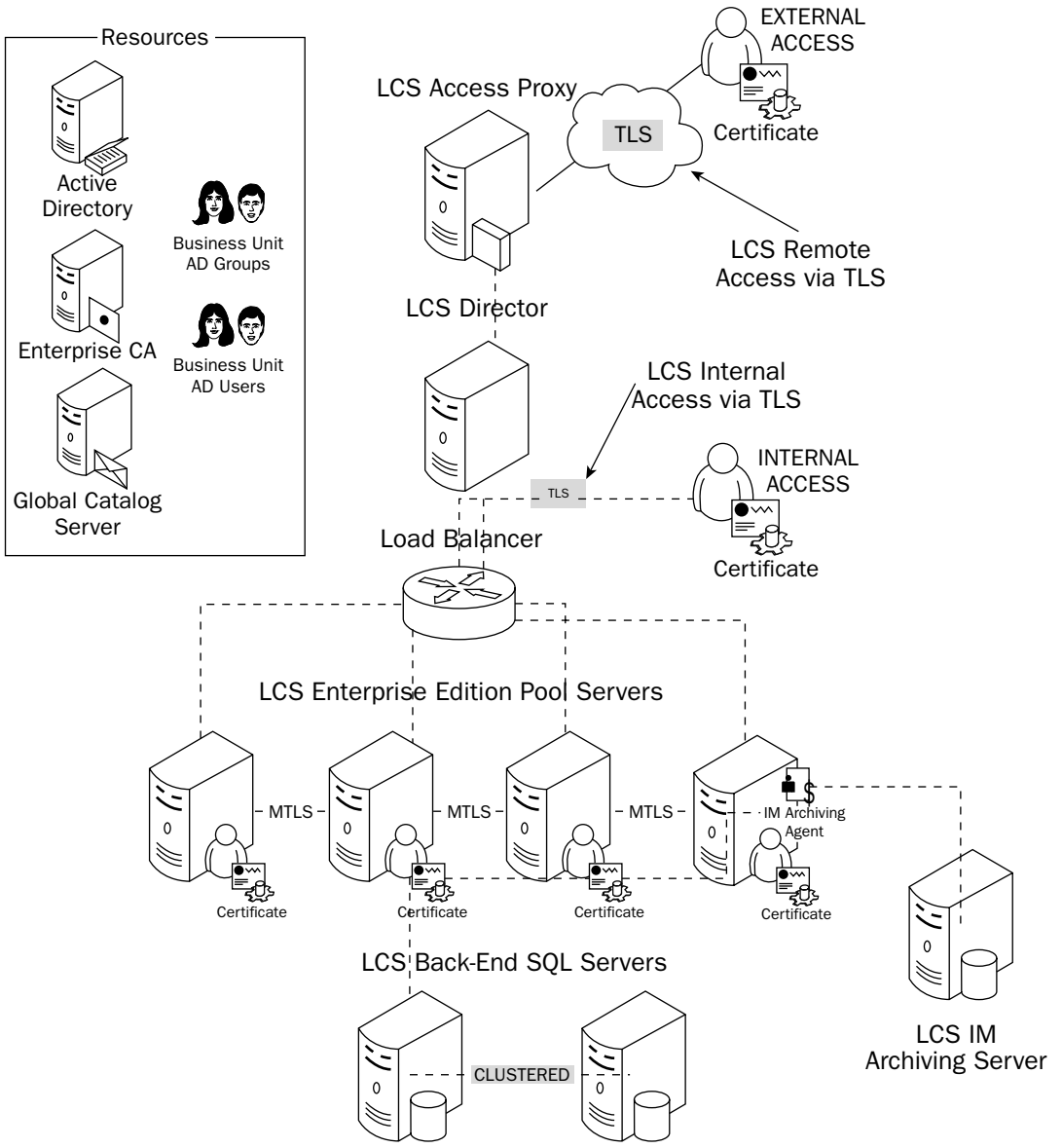

Figure 1-9

MTLS

Live Communications Server also uses Mutual Transport Layer Security (MTLS) to configure a trust between Live Communications Server servers. A server certificate is applied within the Live Communications Server console to enable a MTLS connection from one Live Communications Server to another with an Extended Key Usage (EKU) setting of Server Authentication. MTLS is also used to provide secure connectivity to the public Instant Messaging networks, which include Yahoo, MSN, and AOL.

Introducing Microsoft Office Communicator 2005

Without the Microsoft Office Communicator 2005 client, Live Communications Server would just be a service. The attraction to the Live Communications Server solution is primarily due to the features and functionality present in the Communicator 2005 client, with its capability to enable secure Instant Messaging, communication and telephony integration, as well as the capability it offers to connect with public Instant Messaging contacts through one client application. This section highlights some of the most popular features within Microsoft Office Communicator 2005. For more detailed information, please visit the Microsoft Live Communications Server website via `www.microsoft.com/lcs`.

Communicator 2005 Features

Microsoft Office Communicator 2005 is packed full of features and functionality beyond Instant Messaging. Based on customer requests and common use of existing Instant Messaging application features, Communicator 2005 provides the following features out of the box:

- **Instant Messaging:** Instant Messaging is provided for Communicator 2005 users to contact one another or public Instant Messaging applications such as Yahoo Messenger, AOL Instant Messenger, and MSN Messenger, as shown in Figure 1-10.
- **Contact Search:** This feature provides the capability to search for a contact by name, as shown in Figure 1-11. During a contact search, a user enters the name of an individual or group and instantly can view the contact's presence without having to add the resource to their contact list.
- **File Transfer:** File transfer, shown in Figure 1-12, is provided to enable quick access to sharing and sending of files between contacts. To enhance your LCS environment, utilize the anti-virus integration capabilities to cleanse files before they are received.

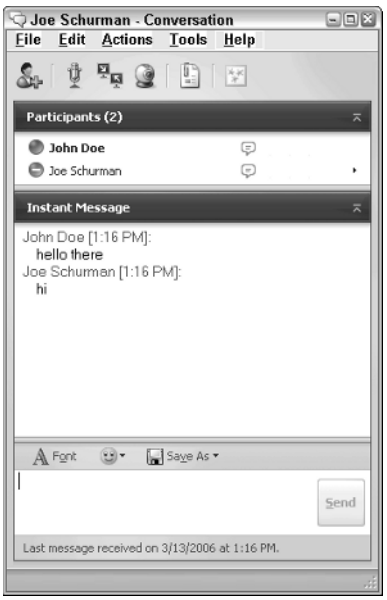

Figure 1-10

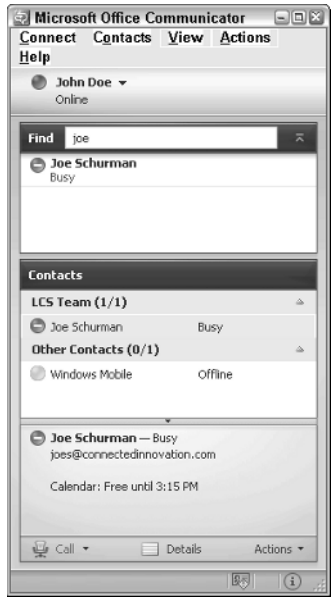

Figure 1-11

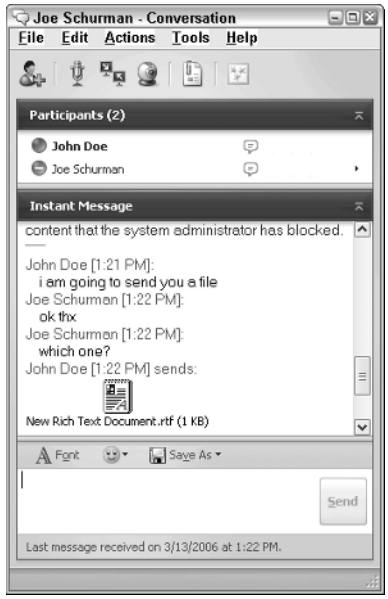

Figure 1-12

- **Mode Type:** With MOC, you can take part in a messaging conversation in one of three modes: handwrite, type, or convert. Tablet PC users now have the option to handwrite their instant messages to contacts, as shown in Figure 1-13.

Figure 1-13

- **Conversation Type:** MOC provides the capability to create Instant Messaging, audio/video, or telephony conversations, as shown in Figure 1-14.

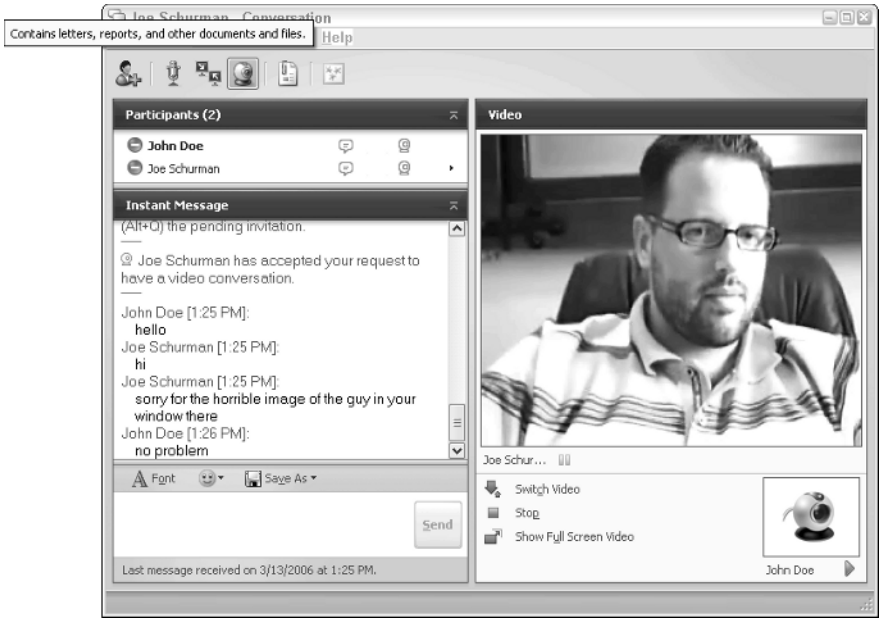

Figure 1-14

- **Presence:** With MOC, contacts are enabled with presence status, which can be modified individually or by using advanced status with direct integration with Microsoft Office 2003, as shown in Figure 1-15.
- **Application Sharing:** MOC provides contacts with the capability to share applications, including the desktop, with one another.
- **Whiteboard:** With the MOC Whiteboard feature, contacts can express ideas and thoughts by using a shared whiteboard application, as shown in Figure 1-16.
- **Office Integration:** MOC provides direct integration with the Microsoft Office system, with integration into Microsoft Outlook 2003 for calendar presence, and the capability to be started within Office programs such as Microsoft Word, Excel, PowerPoint, and SharePoint Portal Server 2003. More information related to integration with Microsoft Office 2003 is covered in Chapter 3.
- **Telephony Integration:** MOC and LCS provide integration into PBX and PSTN services to provide contacts with a truly integrated communications client.

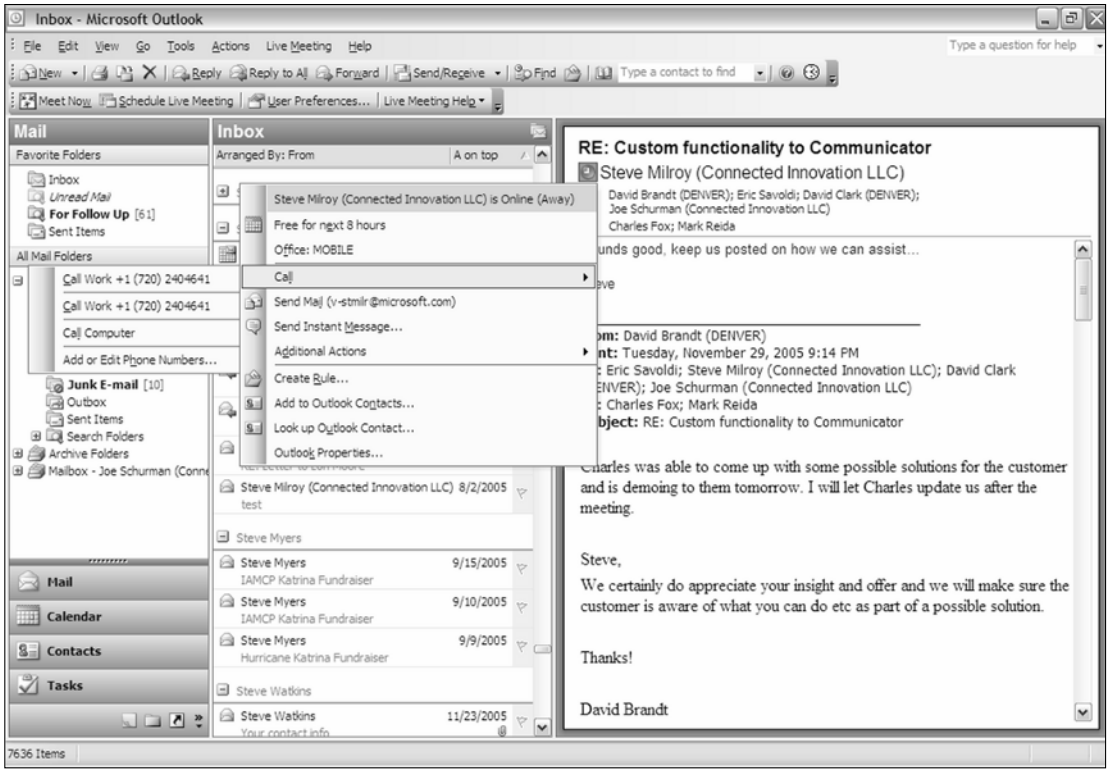
Inbox - Microsoft Outlook
File Edit View Go Tools Actions Live Meeting Help
Type a question for help
New Reply Reply to All Forward Send/Receive Find Type a contact to find
Meet Now Schedule Live Meeting User Preferences... Live Meeting Help
Mail
Favorite Folders
Inbox
Unread Mail
For Follow Up [61]
Sent Items
All Mail Folders
Call Work +1 (720) 2404641
Call Work +1 (720) 2404641
Call Computer
Add or Edit Phone Numbers...
Junk E-mail [10]
Outbox
Sent Items
Search Folders
Archive Folders
Mailbox - Joe Schurman (Conne
Mail
Calendar
Contacts
Tasks
Inbox
Arranged By: From
A on top
Steve Milroy (Connected Innovation LLC) is Online (Away)
Free for next 8 hours
Office: MOBILE
Call
Send Mail (v-stmilr@microsoft.com)
Send Instant Message...
Additional Actions
Create Rule...
Add to Outlook Contacts...
Look up Outlook Contact...
Outlook Properties...
Steve Milroy (Connected Innovation LLC) 8/2/2005
test
Steve Myers
Steve Myers 9/15/2005
IAMCP Katrina Fundraiser
Steve Myers 9/10/2005
IAMCP Katrina Fundraiser
Steve Myers 9/9/2005
Hurricane Katrina Fundraiser
Steve Watkins
Steve Watkins 11/23/2005
Your contact info
RE: Custom functionality to Communicator
Steve Milroy (Connected Innovation LLC)
David Brandt (DENVER); Eric Savoldi; David Clark (DENVER);
Joe Schurman (Connected Innovation LLC)
Charles Fox; Mark Reida
unds good, keep us posted on how we can assist...
eve
om: David Brandt (DENVER)
nt: Tuesday, November 29, 2005 9:14 PM
: Eric Savoldi; Steve Milroy (Connected Innovation LLC); David Clark
ENVER); Joe Schurman (Connected Innovation LLC)
: Charles Fox; Mark Reida
bject: RE: Custom functionality to Communicator
Charles was able to come up with some possible solutions for the customer and is demoing to them tomorrow. I will let Charles update us after the meeting.
Steve,
We certainly do appreciate your insight and offer and we will make sure the customer is aware of what you can do etc as part of a possible solution.
Thanks!
David Brandt
7636 Items

Figure 1-15

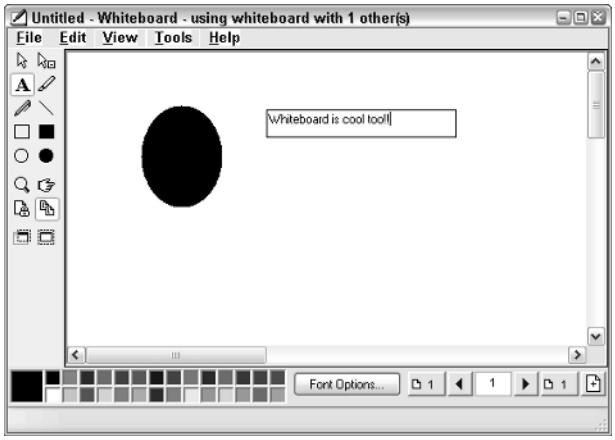

Figure 1-16

Public Instant Messaging Connectivity Integration

One of the most exciting and most anticipated features of Live Communications Server 2005 SP1 is the Public Instant Messaging Connectivity (PIC) service. With PIC, LCS users have the ability to add and contact users of a public network from their Microsoft Office Communicator 2005 client. These conversations are then secured using Mutual Transport Layer Security (MTLS). Figure 1-17 shows a diagram depicting the PIC architecture for external connectivity to public Instant Messaging applications, including Yahoo, AOL, and MSN, over a secured MTLS connection.

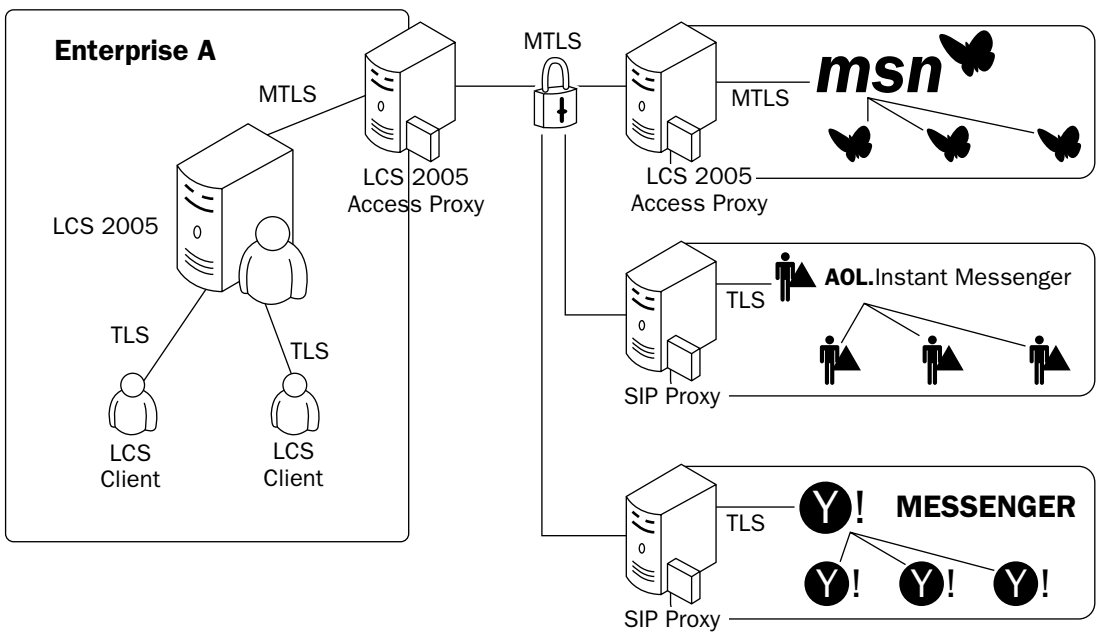

Figure 1-17

Although the diagram depicted in Figure 1-17 showcases integration with the three most popular Instant Messaging applications, the Live Communications Server service can integrate with other provisioned public Instant Messaging services as long as the services provide a proxy that allows Session Initiation Protocol (SIP)–based communications. Once enabled, users have the ability to add PIC contacts to their Microsoft Office Communicator 2005 client and are ready for instant communication, as depicted in Figure 1-18.

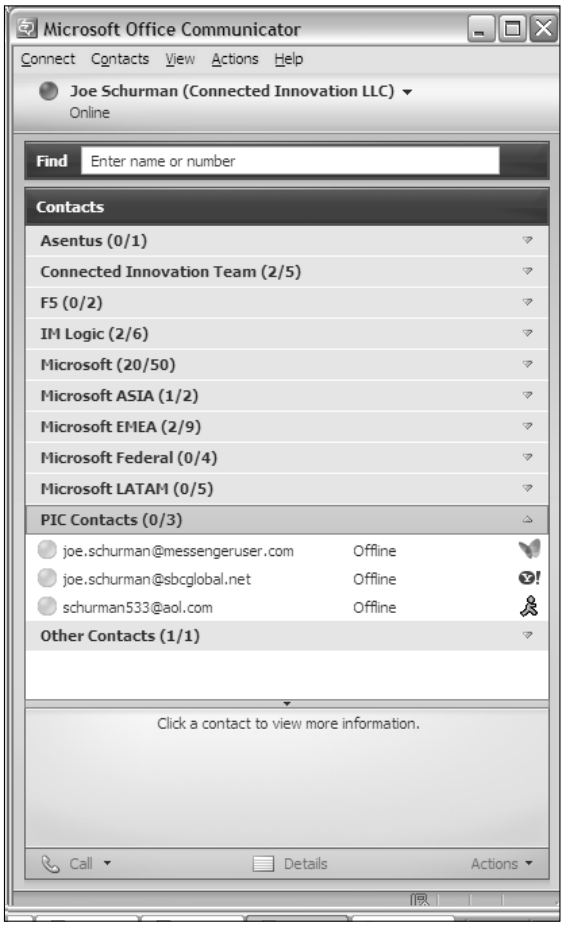

Figure 1-18

Another noteworthy aspect regarding communication between LCS and PIC contacts is that when a contact's status changes in Communicator 2005, it is displayed in whatever way the public Instant Messaging client application is set to display the contact's status. For example, when a contact's presence status is set to "Away" in Communicator 2005, the presence status for this individual is listed as "Stepped Out" in Yahoo Messenger. All in all, the PIC service within LCS enables greater reach without sacrificing the security of enterprise data.

Telephony Integration

Converged communications is becoming a necessity in today's marketplace. With Live Communications Server 2005 with Service Pack 1 and Microsoft Office Communicator 2005, organizations now have the ability to integrate telephony features, Instant Messaging, and Audio/Video communications all within one application. Integration with new and legacy PBX systems and PSTN services is provided as an out-of-the-box feature with minor configuration.

PBX Integration

LCS supports the Computer Supported Telecommunications Applications (CSTA) over SIP protocol, which is accepted by most PBX providers. For legacy PBX applications, LCS requires a third-party solution such as the Genesys GETS service, which translates SIP over CSTA communications to legacy PBX systems. Newer PBX systems will support SIP natively without the need for this SIP/CSTA bridge, but most companies are reluctant to upgrade their PBX systems because they have been in place for decades. Therefore, as a consultant, when deploying LCS for a customer, it is important to have some familiarity with these third-party solution providers (e.g., Genesys, Nortel, Mitel, and others).

When integrating your LCS environment with a legacy or new PBX system, Communicator 2005 is enabled with Remote Call Control (RCC), which provides individuals with the ability to control their desk phone to accept, return, and forward phone calls directly from the application.

PSTN Integration

Where LCS PBX integration provides local calling features within Communicator 2005, PSTN integration with LCS provides connectivity with PSTN services or 1-800 calling services such as MCI. LCS uses the LCS PSTN Gateway to transfer and translate data between the internal LCS environment and the PSTN service to provide seamless integration.

When PSTN integration is enabled, Communicator 2005 enables individuals to create Live Meeting Web conferences and participate in conference calls directly from one client. This combined solution provides ease of use for a Communicator 2005 user and a truly converged communication client application.

Microsoft Office Communicator 2005 Web Access

To provide customers with the capability to deploy Microsoft Office Communicator to almost any desktop, Microsoft released a web-accessible client to LCS with the Microsoft Office (r) Communicator 2005 Web Access (CWA) application. CWA is especially useful for organizations that have tight control over their users' desktop applications, and it can reduce deployment time frames dramatically. CWA provides Instant Messaging and presence features only, and it does not enable the advanced telephony integration and sharing features that are available in the desktop client.

Figure 1-19 depicts the CWA client application.

Microsoft Office Communicator 2005 Mobile

Extending Microsoft Office Communicator 2005 even further, the Microsoft Office Communicator 2005 Mobile client, known by its nickname "CoMo," provides client access to LCS via a mobile device. With CoMo, contacts can take their presence on the road and never skip a beat. CoMo provides contacts with the IM and presence features similar to that of the CWA client so that a contact can take part in IM sessions when needed.

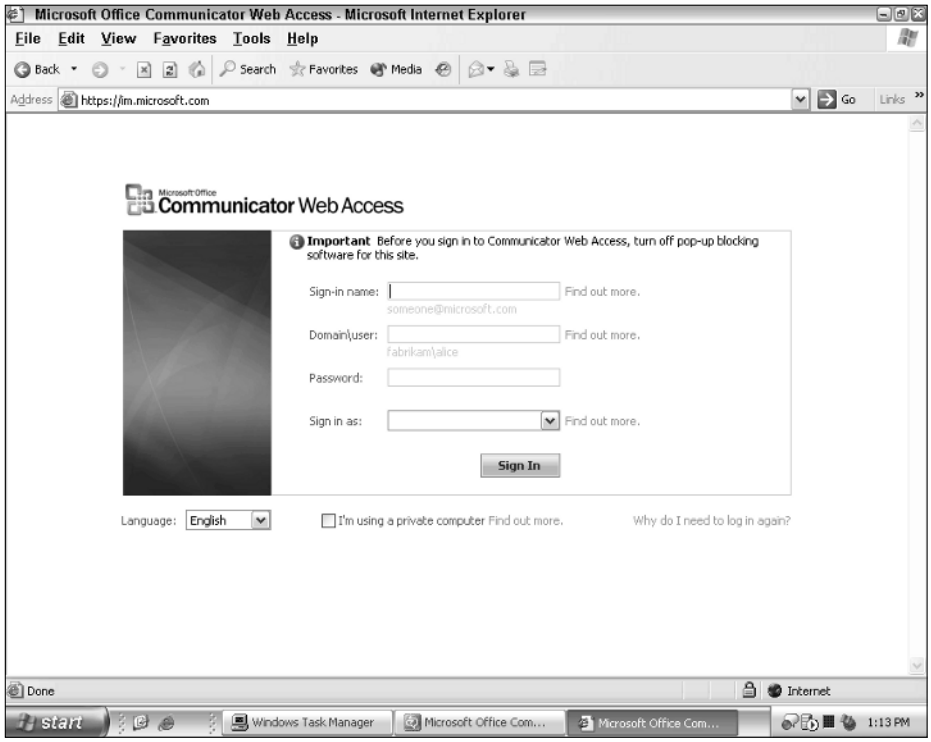

Figure 1-19

What I personally love about the CoMo client is that I have the capability to search for contacts I do not have in my contacts list on my device, including a list of published numbers for each contact. If you are a geek like me, you purchase a new Microsoft Windows Mobile device as soon as the latest one hits the shelves. What is great about CoMo is that I never have to worry about whether or not I have a contact in my mobile contacts list. With IM, presence, and search functionality within CoMo you are in total control.

Summary

The purpose of this chapter was to introduce Microsoft Unified Communications by providing an overview of all of the components that are included in the Unified Communications suite of applications. Chapter 2 discusses how Microsoft Unified Communications fits in the enterprise, as existing applications such as IBM Sametime have dominated the market for some time. Also covered in the next chapter are deployment time frames and what a typical UC project can consist of when deploying Live Communications Server 2005 and Communicator 2005 for enterprise customers.